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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,287	02/08/2001	George Ernest Morris	37,248-04	6598

4249 7590 04/22/2003

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EXAMINER

GRIFFIN, WALTER DEAN

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 04/22/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/779,287

Applicant(s)

MORRIS ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

The declaration filed on February 11, 2003 under 37 CFR 1.131 is sufficient to overcome the Yen et al. (US 6,402,939) reference.

The rejection of claim 21 under 35 U.S.C. 112, second paragraph, as described in paper no. 5 has been withdrawn in view of the amendment filed on February 11, 2003.

In view of the withdrawal of all previous rejections, the arguments concerning these rejections are moot and will not be addressed. New rejections follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748) in view of EP 0482841 A1, and Ford et al. (3,341,448).

The Hatanaka reference discloses a process in which a sulfur-containing gas oil is hydrotreated to remove sulfur compounds. This gas oil would necessarily have an API gravity within the claimed range. This hydrotreating is conducted in the presence of a hydrotreating catalyst. The resulting hydrotreated feed is separated into a light fraction and a heavy fraction. The cut point temperature for separation of the fractions is in the range of 300 to 350°C. The light fraction is essentially free of sulfur whereas the heavy fraction must be further desulfurized to remove, for example, dibenzothiophene compounds. Following this further desulfurization, the light and heavy fraction are blended to produce a fuel. See col. 2, lines 65-67; col. 3, lines 1-11 and 26-56; col. 4, lines 11-67; col. 5, lines 1-23 and 65-67; and col. 6, lines 1-10.

The Hatanaka reference does not disclose desulfurization of the heavy fraction by contacting it with a quaternary ammonium salt, hydrogen peroxide, and acid.

The EP 0482841 A1 reference discloses a process for desulfurizing a hydrocarbon oil such as a diesel by combining the oil with an aqueous solution of an oxidant such as hydrogen peroxide and catalyst and oxidizing the sulfur in the oil. The catalyst can be a phosphotungstic acid. A phase transfer agent such as a quaternary ammonium salt can be included in the solution. The oxidized sulfur is then separated from the oil. The separation can be performed by

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contacting the oil with a solvent (e.g., C₁-C₄ alcohols) to extract the oxidized sulfur or by contacting the oil with an adsorbent such as silica. See page 2, line 26 through page 3, line 13 and the examples.

The Ford reference discloses that the degree of desulfurization achieved by successive oxidative and hydrodesulfurization stages is significantly higher than that achieved by either two successive oxidative desulfurization stages or two successive hydrodesulfurization stages and that the improvement is independent of the order of the stages. See col. 3, lines 13-30.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Hatanaka by substituting the desulfurization process of EP 0482841 A1 for the second desulfurization of Hatanaka because the desulfurization of EP 0482841 A1 is effective for removing sulfur compounds removed by the second desulfurization of Hatanaka. Additionally, as disclosed by Ford, combining the first hydrodesulfurization of Hatanaka with the oxidative desulfurization of EP 0482841 A1 would result in the expectation that a significantly higher degree of desulfurization would be achieved than is achieved by the two successive hydrodesulfurization stages disclosed by Hatanaka.

Regarding the claimed quaternary ammonium salt, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by utilizing the claimed quaternary ammonium salts because these salts are chemically similar to the disclosed salts and therefore would be expected to be effective in the claimed process.

Regarding the recycle of the aqueous phase, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by

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recycling the aqueous phase because material costs will be reduced by recycling thereby improving the economics of the process.

Regarding the presence of nitrogen in the feed, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by utilizing a feed that also contains nitrogen compounds because one would expect the sulfur compounds to be effectively oxidized regardless of the presence of nitrogen.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748), EP 0482841 A1, and Ford et al. (3,341,448) as applied to claim 17 above, and further in view of Takacs (US 3,909,395).

None of the previously discussed references discloses the treatment with a carbonate or bicarbonate solution.

The Takacs reference discloses that oxidized hydrocarbon streams are washed with a carbonate solution to obtain a treated stream that contains a reduced amount of oxidized sulfur compounds. See column 3, lines 8-12.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by washing the treated liquid with a carbonate solution as suggested by Takacs because the treated liquid will have a reduced amount of sulfur compounds.

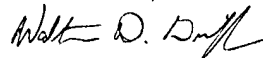
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.


Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
April 10, 2003